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REMARKS

In the pending Office Action, claims 1-7 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 5,905,568 to McDowell et al. in view of a publication by Wiskott et al. titled "Face Recognition by Elastic Bunch Graph Matching", Internal Report IR-INI 96-08, Institut fur Neuroinfomatik, April 1996, pages 1-21 (the "Wiskott" paper). Claims 8-10 were not addressed in the Office Action.

Applicants respectfully traverse each of the rejections and respectfully request reconsideration of this application in light of the following remarks.

The rejection of independent claim 1 as allegedly unpatentable over the McDowell patent in view of the Wiskott paper is respectfully traversed. The McDowell patent determines the location (and velocity) of tracer particles in a liquid using a centroid algorithm. The tracer particles are imaged as having a diameter of three to five pixels and the centroid algorithm determines the center of the multi-pixel blob. See, column 9 lines 6-46. These "blobs" have no distinguishing features other than size and shape. Claim 1 recites "locating the feature in the left camera image and in the right camera image using bunch graph matching". A bunch graph is based on a model graph. The nodes of the model graph are at defined positions called landmarks of an object, such as a face, which correspond to features of the object. Jets are associated with nodes of the model graph. A "bunch" graph is derived by applying the model graph to a gallery of objects, such as a collection of facial images. See, U.S. Patent No. 6,301,370, column 9, lines 1-45 (incorporated by reference in the present application). The Examiner observes that the McDowell patent "does not expressly call for matching the images using bunch graph matching."

The Examiner then asserts the motivation for combining the McDowell patent and the Wiskott publication is that the combination "would at least improve the matching operation, by attaching a plurality of jets to create a bunch graph, and thereby accurately identifying location of particle images in a pair of images". Applicants respectfully disagree with the Examiner's assertion for motivation for combining the references. The bunch graph has nodes which

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correspond <u>to features on an object</u>, not to unattached particles randomly flowing through a fluid. Applicants assert that trying to match nodes of a bunch graph to unattached particles randomly flowing through a fluid is not practical and will not achieve a desirable result, i.e., efficiently locating the three-dimensional position of the particles. Further, even if it were possible to determine the location of unattached particles randomly flowing through a fluid using bunch graph matching (which is doubtful), Applicants assert that the bunch graph matching techniques would be significantly less efficient than the centroid algorithm disclosed in the McDowell patent. Thus, Applicants assert that one skilled in the art would not be motivated to combine the teachings of the McDowell patent and the Wiskott paper as asserted by the Examiner, and would not be motivated replace the centroid algorithm of the McDowell patent with the bunch graph matching technique of the Wiskott paper. Accordingly, Applications assert that claim 1 recites a patentable advance over the cited references, and the rejection of claim 1 as allegedly unpatentable over the McDowell patent in view of the Wiskott paper is improper, and claim 1 should now be allowed.

     The rejection of independent claims 2, 4 and 6 as allegedly unpatentable over the McDowell patent in view of the Wiskott paper are respectfully traversed. The McDowell patent determines the location (and velocity) of tracer particles in a liquid using a centroid algorithm. The tracer particles are imaged as having a diameter of three to five pixels and the centroid algorithm determines the center of the multi-pixel blob. See, column 9 lines 6-46. These "blobs" have no distinguishing features other than size and shape. Claims 2, 4 and 6 recite "locating the feature" in the images "using image analysis based on wavelet component values generated from wavelet transformations" of the camera images. A wavelet transformation involves processing an image using a wavelet to generate a convolution result. A wavelet centered at an image position samples the spatial frequency of local features in the area surrounding the image position. See, U.S. Patent No. 6,301,370, column 8, lines 14-55 (incorporated by reference in the present application).

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The Examiner asserts that it would have been obvious to one having ordinary skill in the art to incorporate the teaching of the Wiskott paper for using image analysis based on wavelet component values generated from wavelet transformations "into the system of the McDowell patent, and to do so would at least improve the accuracy of finding the particle/s (or nodes) locations". Applicants respectfully disagree with the Examiner's assertion of improved accuracy. The wavelet transformation of an image of particles would produce an image of rather indistinct spatial patterns. See, U.S. Patent No. 6,301,370, figures 9 and 10. Applicants assert that trying to locate unattached particles randomly flowing through a fluid "using image analysis based on wavelet component values generated from wavelet transformations" is not practical and will not achieve a desirable result, i.e., efficiently locating the three-dimensional position of the particles. Further, even if it were possible to determine the location of unattached particles randomly flowing through a fluid using image analysis based on wavelet component values generated from wavelet transformations, Applicants assert that the wavelet transformation location techniques would be significantly less efficient than the centroid algorithm disclosed in the McDowell patent.

Further, in the Office Action, the Examiner does not address the issue of motivation to combine the references with respect to claims 2, 4 and 6. The showing of motivation to combine references is an essential component of an obviousness holding, and the factual inquiry of whether to combine references must be thorough, searching, and based on objective evidence of record. See, In re Lee, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002). Applicants asserts that the stated rejections fail to make the requisite showing of motivation to combine the cited references, and to set forth the objective evidence of record supporting the showing of motivation to combine the references. Accordingly, Applications assert that claims 2, 4 and 6 recite a patentable advance and the rejections of claims 2, 4 and 6 as allegedly unpatentable over the McDowell patent in view of the Wiskott paper is improper, and claims 2, 4 and 6 should now be allowed.

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The rejections of claims 3, 5, and 7, which respectively depend on independent claims 2, 4 and 6, as allegedly unpatentable over the McDowell patent in view of the Wiskott paper are respectfully traversed. Claims 3, 5 and 7 recite that wavelet transformations use Gabor wavelet. For this reasons, and the reasons given above with respect to claims 2, 4 and 6, claims 3, 5 and 7 likewise should now be allowed.

The amendments to claims 6 and 9 provide more consistent language to the respective claims. New claims 11-13 recite that the located feature is an eye of a person's face and are supported by Figures 1-4 of the original specification. New claims 14-19 are directed to a method and apparatus for real-time determination of the location of a person's eyes in three-dimensions for auto-stereoscopic imaging. Support for claims 14-19 is in the original specification in paragraphs [0002] and [0003], and in Figure 2.
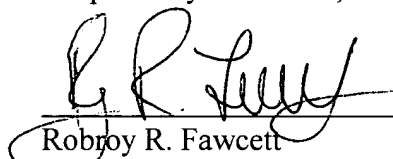
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CONCLUSION

In view of the above amendments and remarks, reconsideration and prompt evaluation of all pending claims are respectfully requested. If any questions or issues remain, the Examiner is invited to contact the undersigned at the telephone number set forth below so that prosecution of this application can proceed in an expeditious fashion.

Respectfully submitted,

Date: November 23, 2005

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